



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,393	08/30/2001	Eugene P. Marsh	MI22-1728	3193
21567	7590	08/08/2005	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			FOURSON III, GEORGE R	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 08/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,393

Applicant(s)

MARSH, EUGENE P.

Examiner

George Fourson

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,20-27,35-38 and 45-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,20-24,26,27,36-38,45-49 and 51-56 is/are rejected.
- 7) ☒ Claim(s) 25,35 and 50 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Art Unit: 2823

The restriction requirement is withdrawn. All pending claims are treated on the merits as discussed below. This office action is as a result made non-final.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

45-49

Claims 1-7, 20-24, 26, 27, 36-38, ~~42-49~~¹ and 51-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raaijmakers et al.

Raaijmakers et al exemplifies formation of tantalum oxide and tantalum pentoxide alternating layers by atomic layer deposition including formation of monolayers, chemisorption and annealing [0044]-[124+] to produce a high-k capacitor dielectric, Raaijmakers et al discloses alternating monolayers of different metal oxides including forming a further dielectric layer on such a layer and including additional chemistries in each cycle [0055-0063] The reference discloses different ratios of different metals and binary cycles [0069]. The reference exemplifies formation of tantalum oxide and zirconium oxide [0072-0075][0106][0123-0124]). The reference exemplifies only two other metals – aluminum and titanium (tables I-VI). See [0057] where formation of a thinner layer 115 followed by further dielectric layers deposited by a similar ALD process is disclosed. See [0069] where different ratios of the different metals of a ternary dielectric is disclosed. See [0117] where it is disclosed that the process can be used to produce a slight doping effect as desired, See [0127] where it is disclosed that the process can be used to form dielectric stacks with enhanced dielectric properties and more stable structure (also see [0121]).

It would have been within the scope of one of ordinary skill in the art to form the recited alternating monolayers of tantalum oxide and zirconium oxide wherein the monolayers are evenly dispersed or

Art Unit: 2823

dispersed as desired to produce a particular dielectric constant of the resulting dielectric layer in view of the disclosed suitability of tantalum containing and zirconium containing source gases as the metal source gases and the discussion related to use of different amounts of each component such as in creating a "slight doping effect".

In view of the disclosure that the amount of metals in the mixed metal oxide formed can be varied and that one of the aims of the variation is to produce dielectric stacks with enhanced dielectric properties, the same goal as that of applicant, one of ordinary skill in the art would have been led to the recited amounts of metal oxides in the dielectric stack produced.

Applicant argues that the reference does not reveal any disclosure to combine monolayers comprising oxygen and zirconium with monolayers comprising oxygen and tantalum. While the reference does not appear to contain such an example there is sufficient guidance to lead one of ordinary skill in the art to use of those two materials as noted above. Specifically, tantalum and zirconium are 2 of the 4 exemplified metals to form either mixed metal oxides, mixed metal silicates or mixtures of metal oxides and metal silicates [0115] including ternary metal oxides [0117]. Therefore, it would not require undue experimentation to arrive at the recited mixed metal oxides given the limited number of combinations disclosed.

Applicant argues that annealing is only disclosed to be used in conjunction with use of tantalum oxide. However, tantalum oxide is present in the process of the combination discussed above.

Art Unit: 2823

Claims 25,35 and 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Fourson whose telephone number is (571) 272-1860. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George Fourson
Primary Examiner
Art Unit 2823

GFourson
July 20, 2005